STUDY OF INSPIRATORY CAPACITY IN COPD THROUGH SURFACE ELECTROMYOGRAPHY

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AIMS: Chronic obstructive pulmonary disease (COPD) is considered an important problem of public health. It is the fourth cause of chronic morbidity and mortality around the world, specially in the United States, and may reach the fifth position in 2020 as a global impact pathology according to the World Health Organization \ World Bank. The air inspired and expired from the lungs can be measured with spirometry during slow respiration or during forced expiratory movements, in order to classify the COPD degree. Electromyography is becoming a tool to evaluate the respiratory musculature due to the changes in respiratory mechanics and muscular respiratory weariness, because it is more comfortable to the patient, avoiding bigger overloads to each individual's body, imposed by spirometry. The study's objective was to evaluate the inspiratory capacity in COPD through surface electromyography of superior and inferior abdominal muscles

METHODS: 15 volunteers of both sexes with age between 42 to 73 years old were divided in two groups: The control group consisted of individuals with normal spirometric performance, having VEF1_80% above forecasted. The COPD group consisted of individuals with spirometric performance compatible with moderate to severe obstruction, having VEF1_60% below forecasted. Once identified the two groups, the recording of the electromyographic activity of superior and inferior abdominal muscles took place, in orthostatic position (upright standing), during the inspiratory capacity. The EMG activity was captured by an EMG System do Brasil Ltda composed of differential double electrode, a bandpass filter at 20 to 1000 Hz, and a subsequent amplification of 50 times with a common mode rejection ratio of 120 dB. The data was sent to a 14-bit A/D converter and sampled at 2000 Hz. A differential double electrode was used, with pré-amplification with 100 times pre-amplification, 25 mm2 contact area and contacts 10 mm apart. Sampling frequency was 2000 Hz. The recommendations from the International Society of Electrophysiology and Kinesiology (ISEK) regarding electromyography’s applications were followed here. The results were analysed using independent t-test (p<0.05).

RESULT: No statistically significant difference was observed when comparing the RMS (Root Mean Square) values taken for the superior and inferior abdominal muscles of all volunteers from groups A and B, during the inspiratory capacity.

CONCLUSION: The electromyographic records in both groups did not show alterations between groups during inspiratory capacity, since in the COPD group, the expiration is no longer passive due to the alterations in the respiratory mechanics, resulting in a paradoxal respiration which makes the patients use actively the abdominal musculature.